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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,982	10/01/2003	Christian L. Belady	10018060-3	7690

22879 7590 02/08/2006

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EXAMINER	
DUONG, THO V	
ART UNIT	**PAPER NUMBER**
3753	

DATE MAILED: 02/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/676,982	BELADY ET AL.	
	Examiner	Art Unit	
	Tho v. Duong	3753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,5,10-12,18,21,23,24 and 26-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2,5,10-12,18,21,23,24 and 26-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/16/05 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed subject matter of "wherein the pin heads collectively and macroscopically conform to an object coupled thereto transfer heat from the object" and "the pin heads arranged in a geometric...that one or more of the pin heads outside the region of contact are non-contacting with the object" renders the scope of the claim indefinite since it is not clear how the pin heads coupled to an object as claimed while one or more pin heads of the same pin heads is claimed to not in contact with the object.

Claim 12 is further rejected as can be best understood by the examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2,12 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu (US 4,226,281). Chu discloses (figures 1, 6 and column 4, line 65- column 5, line 2) a thermal interface (10) comprising a thermal spreader (18) forming a plurality of passageways (22); a spring element such as layer with a substantially planar face of sponge like material (36) coupled with the spreader (18); and a plurality of thermally conductive pins (24) for the passageways and perpendicular with the planar face of the spring element (36); each of the pins (24) having a head (25) and a shaft moving with the spring element (36); at least part of the shaft being internal to the passageway and forming a gap between the pin (24) and the gap (22), which is filled with a thermal grease or helium gas; the pin heads (25) collectively and macroscopically conform to an object (12,14) couple thereto; the head (25) being substantially flush with the face of the spring element (36); the object comprising a semiconductor die (12). Regarding to the limitation of "a flat endmost surface of each of the pin heads", Figure A as shown bellow discloses the flat surface of the pin head (25) is the end most surface of the pin head since it form a boundary for the pin head. Regarding claim 12, Chu discloses (figure 1) that one of the semiconductor chip

(12) is considered to read as an object, for example the center chip (12). There are some pin heads (24) located outside of the central chip are non-contacting with the central chip.

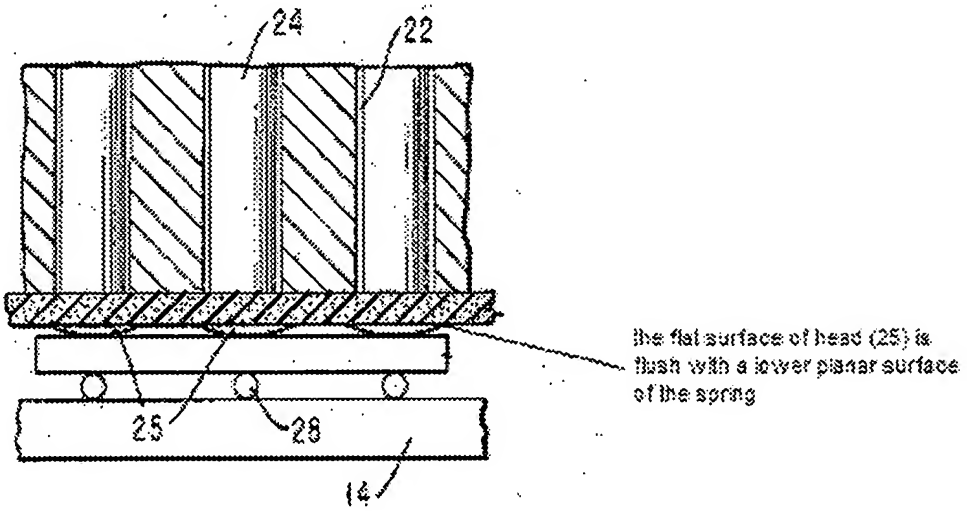

Figure A: The modified figure corresponds to figure 6 with flushed surface shown

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 18, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu (U 4,226,281) in view of Lamb et al. (US 5,920,457). Chu substantially discloses all of applicant's claimed invention as discussed above except for the limitation that the rubber sponge material is thermal conductive. One of ordinary skill in the art would see that if the sponge material (36) is a thermal conductive material, it will enhance the heat dissipation of heat

generating device (12) by forming an additional thermally conductive path between the head of the pin and the heat spreader (18). Attention is now directed to reference to Lamb for teaching of thermally conductive sponge material being both springy and thermally conductive using in a heat dissipation apparatus. Lamb discloses (figure 1 and column 2, lines 52-65) a heat dissipation apparatus having an interface material (120) disposed between a heat generating source (102) and a heat sink (130) wherein the interface material is made of a rubber sponge material which has a thermal conductivity of 0.5wat/(deg-K-meter) at 5 psi for the purpose of providing a thick compressible interface material and a good conduction heat path between the heat source and the heat sink. Since Chu and Lamb are both from the same field of endeavor, the purpose disclosed by Lamb would have been recognized in the pertinent art of Chu. It would have been obvious to one having ordinary skill in the art to make Chu's sponge material a thermal conductive sponge material as taught by Lamb for the purpose of providing a thick compressible interface material and a good conduction heat path between a heat source and a heat sink. Regarding claim 16,23 and 24, Chu discloses all of the structural limitations of the invention. Therefore, it is believed that Chu's thermal interface is capable of performing the method for transferring thermal energy from a body to a heat sink as claimed.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chu (US 4,226,281) in view of Chu (US 5,394,299). Chu ('281) substantially discloses all of applicant's claimed invention except for the limitation that the pin shaft and the passageways being substantially rectangular. Chu (5,394,299) discloses (figure 2 and column 6, lines 14-21) a thermal transfer interface that has a thermal spreader having a plurality of passageways (14) and pistons (18) located within the passageways wherein the shape of the passageways (14) and

piston are not limited to circular but rather may be rectangular for the purpose of increasing the heat transfer surface area between the pistons and the thermal spreader. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ Chu's (5,394,299) teaching in the device of Chu ('281) for the purpose of increasing the heat transfer surface area between the piston and the thermal spreader.

Claims 5,10,21 and 26-29 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chu (US 4,226,281). Chu'281 substantially discloses all of applicant's claimed invention as discussed above except for the spreader has at least one vent for venting the conductive material. Chu'281 discloses (figure 1) the spreader comprises of a metal block that has an opening with a screw to seal the opening (drawing is also part of the disclosure). Chu'281 does not describe the detail of this opening. However, Chu'281 discloses (column 1, lines 39-44) one of his earlier invention US 3,993,123 that has the similar encapsulated cooling module, in which the opening with a screw is referred as reference number 34. Chu's 123 discloses that the opening (34) is for filling the thermal conductive material inside of the encapsulated module, which is inherently capable of venting out the thermal conductive material such as gas or grease in case of overpressure by unscrewing the screw.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tho v. Duong whose telephone number is 571-272-4793. The examiner can normally be reached on M-F (first Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keasel Eric can be reached on 571-272-4929. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tho v Duong
Primary Examiner
Art Unit 3753

TD
February 2, 2006